

Exercise 9.2b

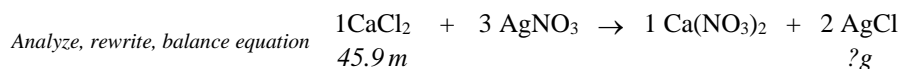
Stoichiometry Errors

Name: _____

Date: _____ Per: _____

DIRECTIONS: In each of the following stoichiometry problems, the work shown has a number of errors. These errors may include errors in defining the problem, setting up the calculation, or in the expression of the final answer. The number of errors is indicated in parentheses () at the end of the question. Circle the errors in each problem and rewrite the work with the corrections made.

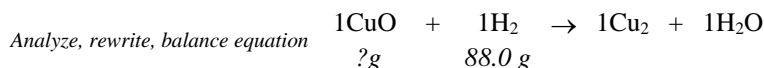
1. Given the equation, $\text{CaCl}_2 + \text{AgNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{AgCl}$, find the mass of silver chloride produced when 45.9 g of calcium chloride reacts with excess silver nitrate. (6)



Solve for only given

$$\frac{45.9 \text{ g CaCl}_2}{110.984 \text{ g CaCl}_2} \times \frac{1 \text{ mol CaCl}_2}{1 \text{ mol CaCl}_2} \times \frac{1 \text{ mol AgCl}}{1 \text{ mol CaCl}_2} \times \frac{143 \text{ g AgCl}}{1 \text{ mol AgCl}} = 323 \text{ g AgCl}$$

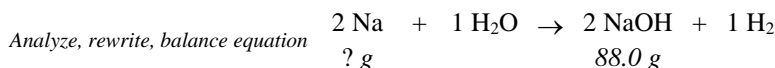
2. Given the equation, $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$, calculate the mass of hydrogen needed to react with 88.0 g of copper (II) oxide? (6)



Solve for only given

$$\frac{88.0 \text{ g CuO}}{79.545 \text{ g CuO}} \times \frac{1 \text{ mol CuO}}{1 \text{ mol CuO}} \times \frac{1 \text{ mol H}_2}{1 \text{ mol H}_2} \times \frac{2.016 \text{ g H}_2}{1 \text{ mol H}_2} = 2.23 \text{ g H}_2$$

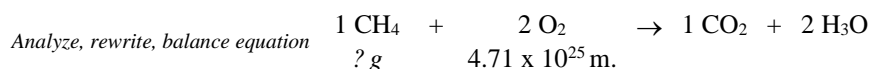
3. Given the equation, $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$, if 88.0 grams of NaOH are produced in the reaction, what mass of sodium was used? (6)



Solve for only given

$$\frac{88.0 \text{ g NaOH}}{39.997 \text{ g NaOH}} \times \frac{2 \text{ mol NaOH}}{2 \text{ mol NaOH}} \times \frac{2 \text{ mol Na}}{2 \text{ mol NaOH}} \times \frac{22.99 \text{ g Na}}{2 \text{ mol Na}} = 50.6 \text{ g NaOH}$$

4. Given the equation, $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$, what mass of methane (CH_4) is needed to completely react with 4.71×10^{25} molecules of oxygen? (6)



Solve for only given

$$\frac{4.03 \times 10^{23} \text{ p. O}_2}{6.022 \times 10^{23} \text{ p. O}_2} \times \frac{2 \text{ mol O}_2}{1 \text{ mol O}_2} \times \frac{1 \text{ mol CH}_4}{1 \text{ mol O}_2} \times \frac{231.837 \text{ g CH}_4}{1 \text{ mol CH}_4} = 627 \text{ g CH}_4$$

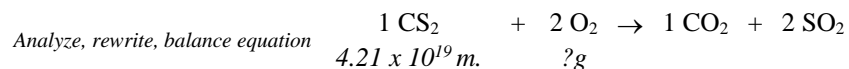
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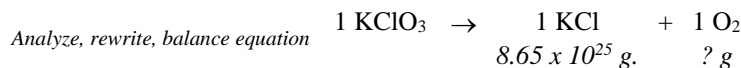
5. Given the equation, $\text{CS}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{SO}_2$, how many grams of carbon disulfide will react with 4.21×10^{19} molecules of oxygen? (5)



Solve for only reactant

$$\frac{4.21 \times 10^{19} \text{ m. O}_2}{6.022 \times 10^{23} \text{ m. O}_2} \times \frac{1 \text{ mol O}_2}{1 \text{ mol O}_2} \times \frac{1 \text{ mol CS}_2}{1 \text{ mol O}_2} \times \frac{76.141 \text{ g CS}_2}{1 \text{ mol CS}_2} = 1.77 \text{ g CS}_2$$

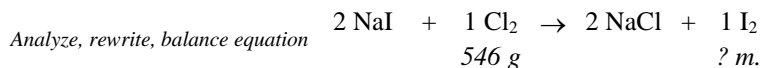
6. Given the equation, $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$, if 8.65×10^{25} molecules of potassium chloride are produced, what mass of oxygen is produced? (9)



Solve for only reactant

$$\frac{8.65 \times 10^{25} \text{ m. KCl}}{6.022 \times 10^{23} \text{ m. KCl}} \times \frac{1 \text{ mol KCl}}{1 \text{ mol KCl}} \times \frac{1 \text{ mol O}_3}{1 \text{ mol KCl}} \times \frac{15.999 \text{ g O}}{1 \text{ mol O}} = 6890 \text{ g O}$$

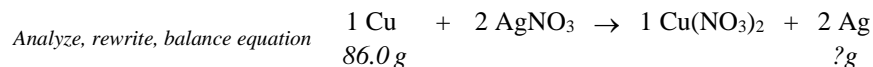
7. Given the equation, $\text{NaI} + \text{Cl}_2 \rightarrow \text{NaCl} + \text{I}_2$, how many molecules of iodine are liberated if 546 g of chlorine react with excess sodium iodide? (4)



Solve for only reactant

$$\frac{546 \text{ g Cl}_2}{70.906 \text{ g Cl}_2} \times \frac{1 \text{ mol Cl}_2}{1 \text{ mol Cl}_2} \times \frac{1 \text{ mol Cl}_2}{1 \text{ mol I}_2} \times \frac{258.30 \text{ g I}_2}{1 \text{ mol I}_2} = 1950 \text{ g I}_2$$

8. Given the equation, $\text{Cu} + \text{AgNO}_3 \rightarrow \text{Cu(NO}_3)_2 + \text{Ag}$, how many grams of silver will be produced if 86 g of copper are used? (5)



Solve for only reactant

$$\frac{86.0 \text{ g Cu}}{6.022 \times 10^{23} \text{ p. Cu}} \times \frac{1 \text{ mol Cu}}{1 \text{ mol Cu}} \times \frac{2 \text{ mol Ag}}{1 \text{ mol Cu}} \times \frac{107.87 \text{ g Ag}}{2 \text{ mol Ag}} = 292 \text{ g Ag}$$